

High PHR, 10-stage, 51 mm (2") round tube

Applications :	For scintillation and photon counting where high sensitivity and high gain are required e.g. nuclear radiation monitoring, emission and absorption spectroscopy...		
Description :	Window :	Material :	lime glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.54
	Multiplier :	Structure :	linear focused
		Nb of stages :	10
	Mass :		120 g

Photocathode characteristics

Spectral range :			290-650	nm
	Maximum sensitivity at :		420	nm
Sensitivity ① :	Luminous :		80	μA/lm
†	Blue :	min.: 9	typ.: 11.5	μA/lmF
	Radiant, at 420 nm :		typ.: 80	mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log) :			7.5	
For an anode blue sensitivity of :			7.5	A/lmF
† Supply voltage :		max.:1100	typ.: 950	V
		min.: 800		
Gain			typ.: 7x10 ⁵	
† Anode dark current ② :		max.: 10	typ.: 1	nA
Pulse height resolution ¹³⁷ Cs ③ :			typ.: 7.5	%
† Pulse height resolution ⁵⁷ Co ④ :		max.: 9.3	typ.: 8.8	%
Single electron spectrum Peak to Valley ratio			typ.: 2.0	
Mean anode sensitivity deviation ⑤ :				
	long term (16 h) :		1	%
	after change of count rate :		1	%
	vs temperature between 0 and +40°C at 420 nm :		- 0.3	%/K
For a supply voltage of :			1200	V
	Linearity (2%) of anode current up to :		20	mA
	Anode pulse rise time ⑥ :		5	ns
	Anode pulse duration at half height :		12	ns
	Signal transit time :		48	ns
Capacitance	anode to all		5	pF

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	A	
2	1	1	1	1	1	1	1	1	1	1	1	(total :12)
K : photocathode			Dn : dynode			A : anode						

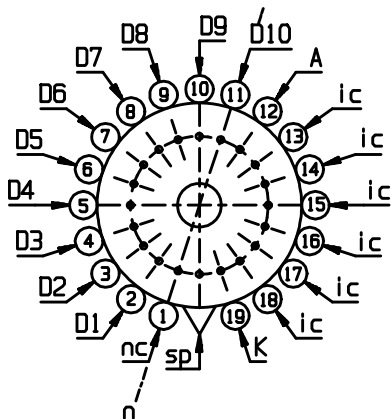
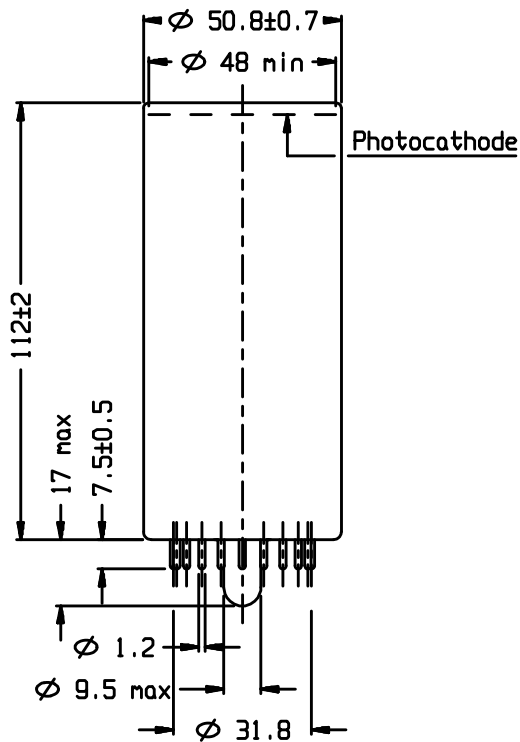
Limiting values

Anode blue sensitivity :		max.:	100	A/lmF		
Supply voltage :		max.:	1500	V		
Continuous anode current :		max.:	0.2	mA		
Voltage between						
	D1 and photocathode :	min.:	100	max.:	500	V
	consecutive dynodes :			max.:	300	V
	anode and D10 :	min.:	40	max.:	300	V
Ambient temperature						
	short operation (< 30 mn) :	min.:	-30	max.:	+80	°C
	continuous operation & storage :	min.:	-30	max.:	+50	°C

Notes

Characteristic measured and mentioned on the test ticket of each tube.

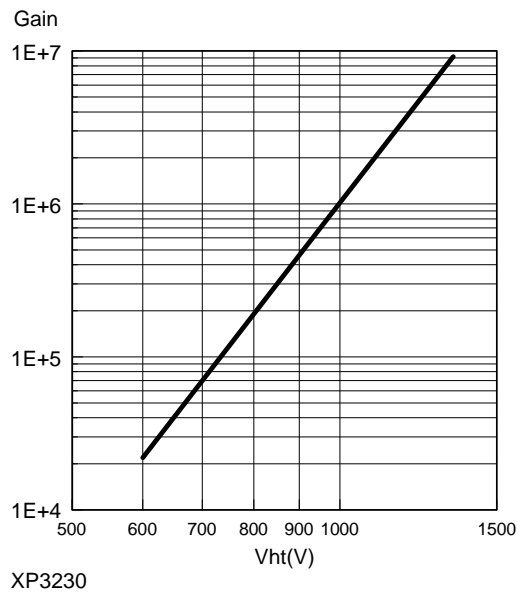
- ① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue sensitivity, expressed in A/lmF ("F" as in Filtered) is measured with a tungsten filament lamp with a color temperature of 2856 ± 5 K. Light is transmitted through a blue filter Corning CS no.5-58, polished to half stock thickness. The radiant sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. Light is transmitted through an interference filter. Radiant sensitivity at 420 nm, expressed in mA/W, can be estimated by multiplying the blue sensitivity, expressed in μ A/lmF, by 7.5 for this type of tube.
- ② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).
- ③ Pulse amplitude resolution for ^{57}Co is measured with a NaI(Tl) cylindrical scintillator with a diameter of 51 mm and a height of 51 mm. The count rate used is $\sim 10^4$ c/s.
- ④ Pulse amplitude resolution for ^{137}Cs is measured with a NaI(Tl) cylindrical scintillator with a diameter of 51 mm and a height of 51 mm. The count rate used is $\sim 10^4$ c/s.
- ⑤ The mean pulse amplitude deviation is measured by coupling a NaI(Tl) scintillator to the window of the tube. Long term (16h) deviation is measured by placing a ^{137}Cs source at a distance from the scintillator such that the count rate is $\sim 10^4$ c/s, corresponding to an anode current of ~ 300 nA. The mean pulse amplitude deviation after change of count rate is measured with a ^{137}Cs source at a distance from the scintillator such that the count rate can be changed from 10^4 to 10^3 c/s, corresponding to an anode current of $\sim 1 \mu\text{A}$ and $0.1 \mu\text{A}$ respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations
- ⑥ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1 ns., the cathode being completely illuminated. The rise time is determined between 10 % and 90 % of the anode pulse amplitude. The signal transit time is measured between the instant at which the illuminating pulse of the cathode becomes maximum, and the instant at which the anode pulse reaches its maximum. Rise time, pulse duration and transit time vary with respect to high tension supply voltage V_{ht} as $(V_{ht})^{-1/2}$.



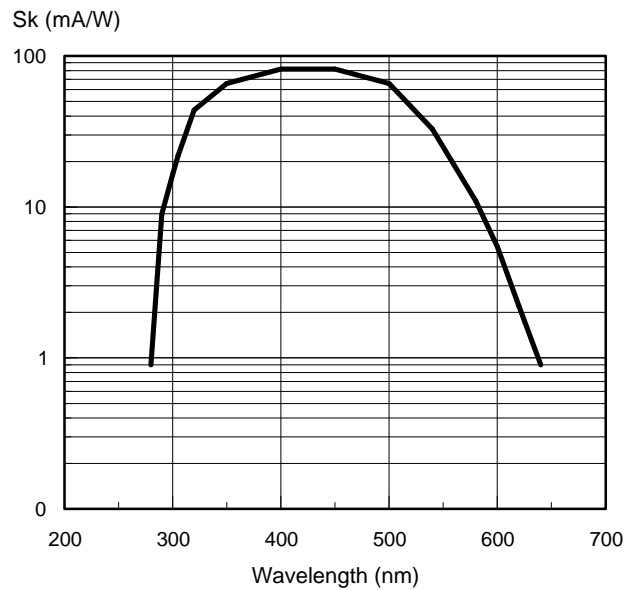
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- sp: short pin
- nc: not connected
- ic: internal connection
- n: plane of symmetry of the multiplier
- K: cathode Dn: dynode
- A: anode

Typical gain curve



Typical spectral characteristics



XP3232

Accessories

- Socket : FE2019
- Mu-metal shield : MS152